United States Patent [19]

Civitarese

[11] **3,724,387**

[45] **Apr. 3, 1973**

[54] **CONVEYOR SUSPENSION TRACK AND TROLLEY SYSTEM**

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[22] Filed: **Feb. 18, 1971**

[21] Appl. No.: **116,370**

[52] **U.S. Cl.** **104/93,** 16/98, 105/150, 198/177, 295/49

[51] **Int. Cl.** **B61b 3/00,** B65g 17/20, E01b 25/22

[58] **Field of Search** 16/97, 98; 104/93, 106; 105/150; 191/79; 287/189.35; 198/177; 295/49

[56] **References Cited**

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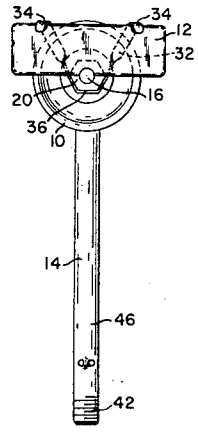
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Primary Examiner—Gerald M. Forlenza
Assistant Examiner—Howard Beltran
Attorney—Strauch, Nolan, Neale, Nies & Kurz

[57] **ABSTRACT**

An improved trolley hanger structure for a track conveyor system comprising a sheave, adapted to ride on the exterior of a tubular rail, rotatably mounted on an axle immovably fixed to a vertically open box frame and semi-journalled therethrough at one end to a depending vertical shank supporting a clothes hanger rack or like structure, and at the other end through a novel spring clip retaining the axle end on the box frame. In another embodiment, a pair of sheaves are supported via two novel spring clips to a similar box frame. The novel clip or clips serve only a retaining function since the weight of suspension of the conveyor system is directed vertically upwardly, through the sheave and axle ends, against the box frame.

15 Claims, 15 Drawing Figures



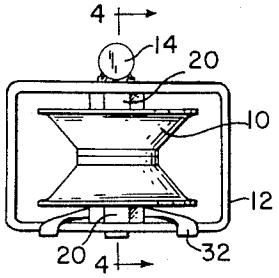


FIG. 3

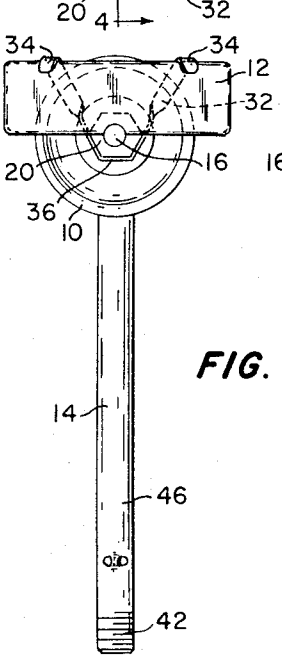


FIG. 1

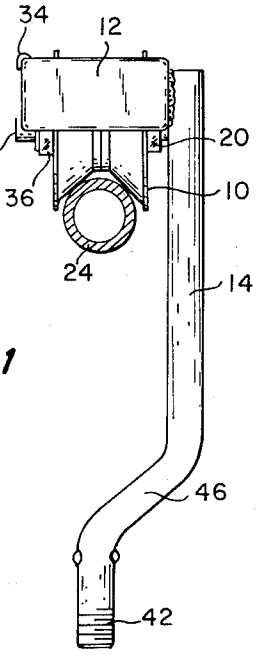


FIG. 2

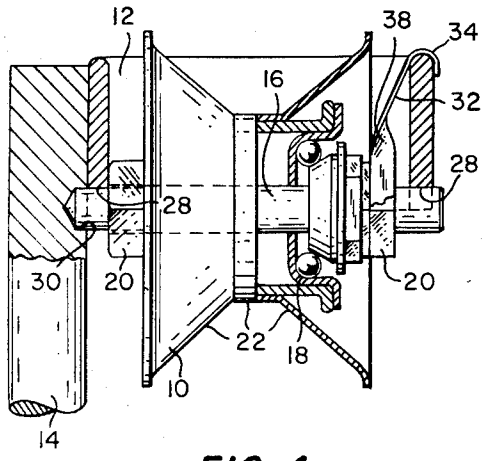


FIG. 4

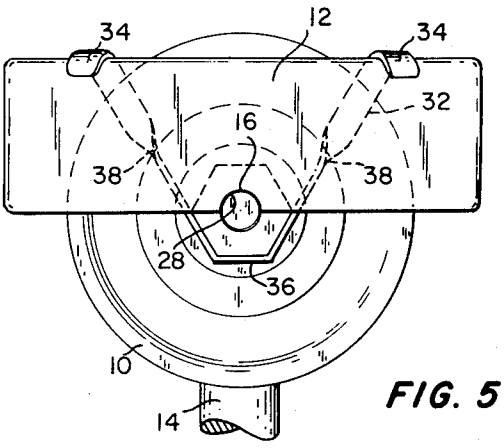


FIG. 5

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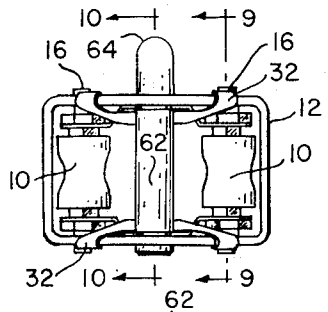


FIG. 8

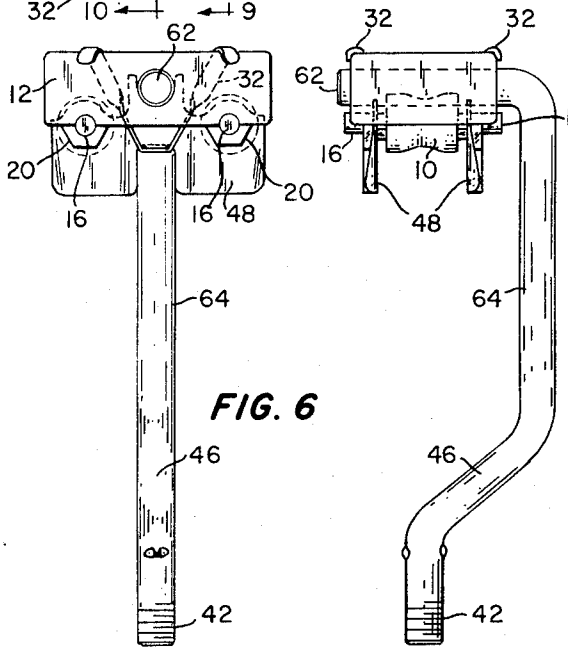


FIG. 6

FIG. 7

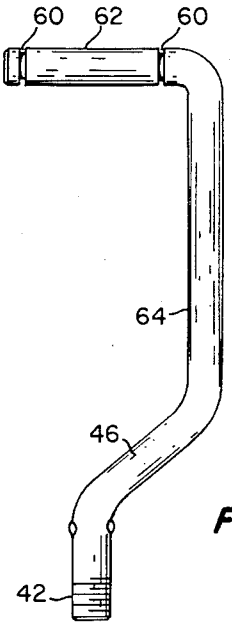


FIG. 11

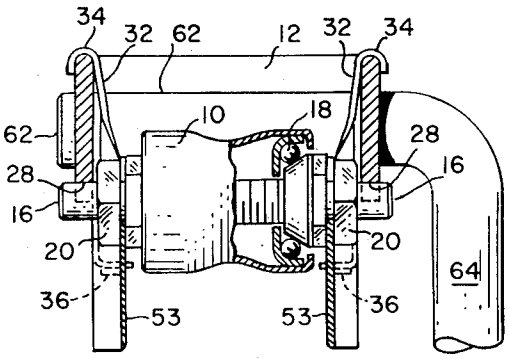


FIG. 9

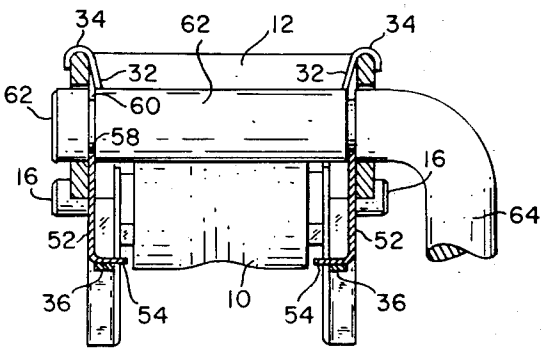


FIG. 10

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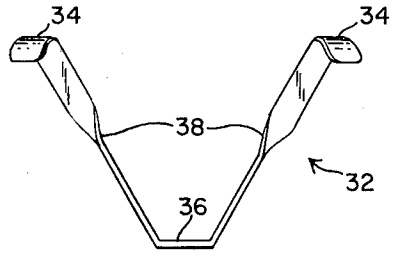
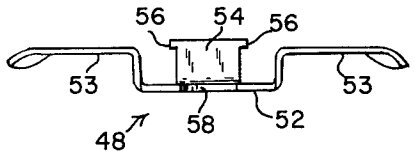


FIG. 12

FIG. 13



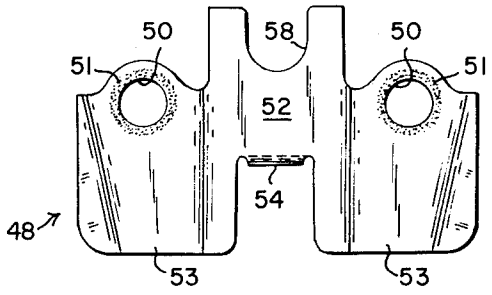


FIG. 14

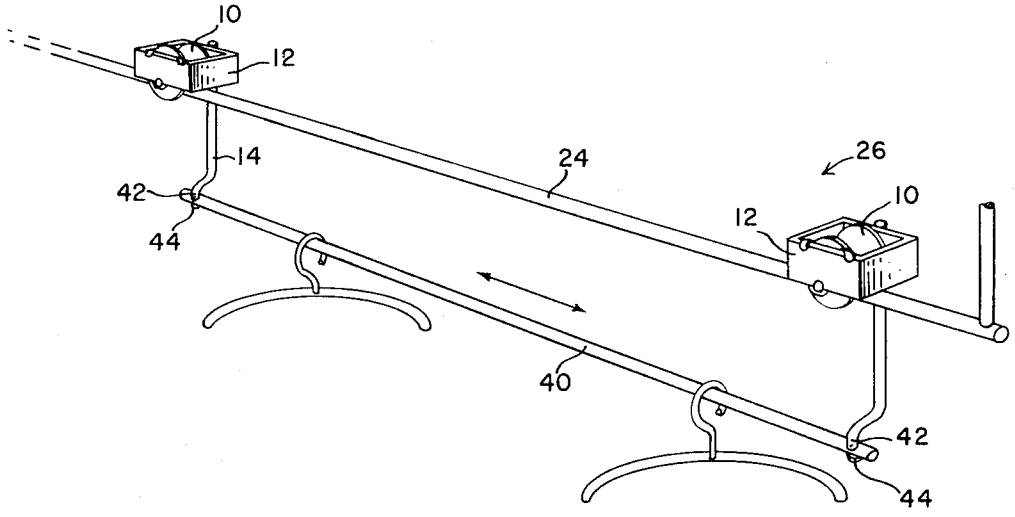


FIG. 15

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CONVEYOR SUSPENSION TRACK AND TROLLEY SYSTEM

BACKGROUND OF THE INVENTION

The invention provides a conveyor system hanger structure comprising a rotatable wheel or sheave adapted to ride on a tubular or like generally horizontal track, and a vertical shank depending therefrom for attachment to a rack to be moved along the track. Essential novelty and utility resides within the hanger structure which includes a simple spring clip structure retaining the sheave in a frame for the sheave, yet easily removed for replacement of a sheave when it is worn out. The axle of the sheave fits within recesses formed in the lower periphery of an open box frame structure and the clip is V-shaped, passing under the axle end and having arcuated ends snap-fit over the upper periphery of the box frame. Thus, the clip serves only a retentive and not a supportive function, as the box frame carries the vertically directed load of the rack, through the sheave and its axle.

The prior art is devoid of any teachings directed to this novel feature. For example, U.S. Pat. No. 859,698 issued to Benjamin Shannon indicates a door hanger structure having axleless wheels which may be easily replaced, but a slotted rail for the hanger shank is required for integrity of structure. U.S. Pat. No. 3,265,011 issued to Steve T. Golden illustrates a rack structure and track assembly of the type generally contemplated herein. The hanger disclosed includes a vertical hook configured shank having a canted wheel riding within a tubular track. The axial center of the wheel and suspension point of interconnection of the shank and supported rack are vertically aligned (FIGS. **2**, **7**, and **8**) but there is no disclosure of an easily removable wheel retaining clip. U.S. Pat. No. 3,479,682 issued to Delmar D. McNinch discloses a hanger for a pivoted, sliding door assembly comprising a wheeled dolly riding on a track and having a depending panel by means of a novel pivoted coupling (FIGS. **4** and **5**). However, no structure for easily removing only the wheels or sheaves of the hanger is disclosed therein.

SUMMARY OF THE INVENTION

It is the principal object of the invention to provide a hanger structure for a track conveyor system comprising at least one sheave, rotatably mounted on an axle retained in an open box frame structure by a novel, retaining, non-supportive spring clip member, the frame including a depending, vertical shank for attaching a rack thereto, whereby a worn sheave may be easily replaced.

It is another object of the invention to provide such a hanger structure wherein the symmetrical center of the sheave axis of rotation and the suspension point of the rack on the shank are vertically aligned for integrity of structure in the conveyor system in a static or moving mode.

Another object of the invention is to provide such a structure wherein an additional or additional sheaves may be added to the hanger, which are retained within the box frame by the same novel spring clip means which serve a retaining and non-supportive function.

Yet another object of the invention is to provide a conveyor system hanger structure wherein worn parts, such as a sheave or sheaves, may be easily replaced without any need of specialized tools or general tools of any nature whatsoever.

A still further object of the invention is to provide a conveyor system with a novel hanger structure wherein in an embodiment calling for two or more sheaves, a novel axle support structure is provided to interconnect sheave axles, said structure being retained in the open box frame by the novel spring clip means.

Further novel features and other objects of this invention will become apparent from the following detailed description, discussion and the appended claims taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF DRAWINGS

FIG. **1** is an elevational view of the invention;

FIG. **2** is an end elevation of the invention as depicted in FIG. **1**;

FIG. **3** is a top plan view of the invention as illustrated in FIGS. **1** and **2**;

FIG. **4** is a partial sectional view taken along lines **4—4** of FIG. **3**, and drawn to an enlarged scale;

FIG. **5** is a partial front elevational view of the invention taken from the upper half of FIG. **1** and drawn to an enlarged scale;

FIGS. **6**, **7** and **8** are front, end, and top plan views of a second embodiment of the invention, and correspond to FIGS. **1**, **2** and **3** hereinbefore described;

FIGS. **9** and **10** are partial sectional views taken along lines **9—9** and **10—10** of FIG. **8**, respectively, and drawn to an enlarged scale;

FIG. **11** is an elevational view of the shank used with the embodiment of the invention illustrated by FIGS. **6** through **10**, inclusive;

FIG. **12** is an elevational view of the novel spring clip structure employed in both of the embodiments illustrated;

FIGS. **13** and **14** are top and elevational views respectively of the novel axle support structure means used in the embodiment of the invention employing two or more sheaves; and

FIG. **15** is a partial view in perspective showing the invention used in a conveyor system.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the drawings by reference character and in particular to FIGS. **1** through **5** thereof, one embodiment of the novel trolley hanger structure of the invention is shown comprising a sheave **10**, a generally vertically open box frame structure **12**, and a load carrying or rack supporting shank **14** depending generally vertically therefrom. Sheave **10** is rotatably mounted on a stationary axle **16** as by means of a ball bearing assembly **18** retained by stop nuts **20**, **20** threaded onto axle **16** (FIG. **4**). The riding surface **22** of sheave **10** is generally semi-annular to ride easily on a tubular track **24** (FIG. **15**). However, its cross sectional characteristics are not essential to the invention and may be from anyone of a wide variety dependent on the type of track **24** employed in the conveyor system **26** (FIG. **15**).

Open box frame structure **12** includes oppositely disposed semi-circular sockets or recesses **28** formed in the lower periphery thereof for receiving the ends of

sheave axle 16. As shown in FIG. 4, shank 14 is welded or otherwise suitably attached to frame 12 medially thereof, adjacent one axle recess 28 (FIGS. 3 and 4) and includes means defining an axle reception well 30, aligned with recesses 28. The other end of axle 16 is retained within its recess 28 by a novel spring clip 32, being a generally V-shaped narrow flat strip having arcuated ends 34, 34 arranged to snap fit over the upper periphery of the box frame 12, and a central base portion 36, bent to conform generally to the outer periphery of stop nut 20 which, in this case, is a common hex nut. Each arm of clip 32 is mesially twisted about 90° at 38 to provide a generally broad flat which may be conformed into base portion 36.

An inspection of FIGS. 2, 4 and 5 reveals that supportive force in the novel hanger will be directed vertically upwardly, through sheave 10 riding on track 24, to the ends of axle 16 and box frame 12 via axle recesses 28, 28 from shank 14 which supports a rack 40 (FIG. 15) at a distal suspension point 42, conveniently threaded to receive the rack 40; nuts 44 retain the rack 40 on shank 14. A lower, mesial sinuous bend 46 is formed in shank 14 so that suspension point 42 and the symmetrical center of the axis of rotation of sheave 10 are vertically planarly aligned (FIG. 2). By this construction, shank 14 will remain in a stable vertical attitude whether rack 40 is stationary or being moved.

Spring clip 32 serves only a retention function and is entirely non-supportive, since supportive forces are directed only upwardly through the ends of axle 16 against recesses 28 of box frame 12 as set forth in the preceding paragraph. Thus clip 32 may be made of a lightweight spring steel so that one or both ends 34 may be easily moved or pinched inwardly, one end 34 towards the other, to remove sheave 10 and axle 16 if and when excessive wear of moving parts occurs. Where clip 32 is removed, axle 16 may be moved downwardly with axle 16 then being withdrawn from well 30 for replacement. The reverse process occurs as a new sheave 10 and axle 16 are installed. A substantial cost saving is thus realized by use of the instant invention as only those parts subjected to wear (the axle and its sheave) are replaced with new parts. Normally, the box frame and shank portions will last the life of the conveyor system, as will the novel spring clip 32, as no excessive supportive forces are even directed through it.

A second embodiment of the invention wherein a pair of sheaves 10 each having an axle 16 are provided is illustrated by FIGS. 6 through 14. Sheaves 10, axles 16, ball bearings 18 and box frame 12 all generally conform to the corresponding parts descriptions hereinbefore set forth with respect to the first embodiment of the invention. Additional parts include a pair of axle supports 48, 48 through drilled at 50, 50 (FIG. 14) to receive the ends of axles 16, 16, and retained thereon against bearings 18 by stop nuts 20. The outer peripheries of through drilled holes 50, 50 may be roughened at 51, 51, to provide a lock surface for stop nuts 20 and thus dispense with the need for washers. Four recesses 28 are provided in the lower periphery of box frame 12 to receive the ends of the two axles 16, 16. Each axle support 48 includes a central vertical standard portion 52 adapted for face to face contact with an inner face of box frame 12 and vertically planarly offset portions 53, 53 which receive the ends of axles 16, 16. Each standard 52 includes a lower spring clip shelf 54 with outer lugs 56, 56, to retain a spring clip base 36 thereagainst. The upper end of each standard 52 is notched at 58 to conform to a pair of annular retention grooves 60 formed about a hooked end 62 of a shank 64 (FIG. 10 and 11).

Unlike the first embodiment, a pair of spring clips 32 are used to retain sheaves 10, their axles 16 and axle supports 48 within box frame 12, and shank 64 is rotatably journalled through box frame 12, being retained therein by notches 58 of standards 52 cooperating with grooves 60 of hooked shank end 62, instead of the shank being welded to the box frame. The lower portion of shank 64 is formed in the same way as shank 14, with a sinuous bend 46 and a terminal rack suspension point 42 for the reasons hereinbefore set forth. Similarly, the configuration and function of novel spring clips 32 remains the same.

Some interplay within a vertical plane transverse the axis of rotation of sheaves 10 is usually necessary in conveyor system hangers to prevent binding or jamming of the rack as it is moved along its track. This is accomplished in the first embodiment by provision of only a single sheave 10, and in the second embodiment by rotatably journaling shank 64 through box frame 12.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiments are therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

What is claimed and desired to be secured by Letters Patent Is:

1. A conveyor hanger comprising a frame having a depending load carrying portion, a non-rotatable transverse axle on said frame, means defining downwardly open socket means in the frame for removably mounting the axle, a sheave rotatably mounted on the axle and adapted to roll along a fixed supporting rail, and readily releasable spring clip means suspended from the frame and connected for retaining the axle in the socket means, the load forces on the hanger being transmitted positively from the depending load carrying portion through the frame, axle and sheave, independently of said clip means.

2. The conveyor hanger recited in claim 1, wherein said spring clip means comprises at least one generally V-shaped integral strip of spring metal having hook formations at the ends of diverging legs by which it is suspended from said frame.

3. The conveyor hanger defined in claim 1, wherein the axle end carries a non-circular formation, and said spring clip means comprises a substantially V-shaped strip shaped at its apex to substantially conform to said formation and having upwardly diverging legs hooked at their ends for attachment to said frame.

4. The invention as recited in claim 1, wherein said axle includes a pair of bearing supports rotatably mounting said sheave on said axle and retained on said axle by a pair of nut means threaded onto said axle, and said releasable clip means comprises a V-shaped nar-

row flat strip with free ends hooked for engaging said frame, and the apex of the V-shaped strip extending conformably beneath and partly around at least one of said pair of nut means.

5. The invention as recited in claim 4, wherein said V-shaped flat strip has a pair of elongate arm portions, each being mesially twisted approximately 90° to provide said apex of the V-shaped flat strip with a broad surface for interengagement with a portion of the periphery of said one of said pair of nut means.

6. A conveyor hanger as defined in claim 1, wherein there are two parallel non-rotatable axles mounted on said frame which is formed with corresponding downwardly open socket means for receiving the axle ends, support members fixedly connected between the adjacent axle ends, and said spring clip means comprising separate spring clips suspended from the frame to non-rotatably engage the supports to hold said axles in said socket means.

7. For use in a conveyor system including a generally elongate track and a suspended rack structure, hanger means suspending the rack from the track comprising:

a. at least one sheave, rotatable along and on top of the track;

b. at least one non-rotatable sheave axle, said sheave being freely rotatably mounted thereon;

c. frame means having downwardly open axle reception means at the lower part thereof;

d. spring clip means suspended from the frame means and means connecting the lower part of said spring clip means to non-rotatably retain at least one axle end in said axle reception means; and

e. a generally vertically disposed shank interconnecting said frame means and said suspended rack.

8. The invention as recited in claim 7, wherein said shank is fixed on said frame and further includes means defining an axle end reception well receiving an axle end opposite the axle end retained by said spring clip means.

9. The invention as recited in claim 7, wherein said shank comprises an elongate stem, mesially bent so that its distal portions are vertically offset, one distal portion secured to said frame, the other distal portion being attached to said rack at a rack suspension point arranged vertically beneath a plane drawn through the center of said sheave at generally right angles to the axis of rotation of said sheave.

10. The invention as recited in claim 7, wherein said hanger means comprises a pair of sheaves, a pair of sheave axles, one for each sheave, and two pairs of opposed axle reception means in said frame, one pair for each axle, said shank including a horizontally disposed hook end rotatably journalled through said frame means, parallel to and vertically above said sheave axles, said spring clip means comprising:

a. a pair of sheave axle supports; and

b. a pair of spring clips, engaging said sheave axle supports and urging corresponding ends of said pair of axles against said pairs of mating axle reception means.

11. The invention as recited in claim 10, wherein each of said sheave axle supports includes an upwardly directed notched portion arranged to abut a corresponding annular groove formed in said shank hook end to retain said shank in said open frame means.

12. The invention as recited in claim 10, wherein each of said sheave axle supports includes a lower shelf, arranged for engagement by one of said spring clip means to retain the sheave support in the frame means.

13. The invention as recited in claim 12, wherein said shelf further comprises laterally formed spring clip retention means.

14. The invention as recited in claim 10, wherein each of said spring clip means comprises a generally V-shaped narrow flat strip having arcuated free ends for engaging the upper periphery of said open frame means, the arms of said V-shaped, flat each being mesially twisted to form a broad horizontal base portion which engages a corresponding sheave axle support.

15. The invention as recited in claim 10, wherein each of said sheave axle supports comprises a central standard portion arranged for face to face contact with a portion of said frame means, and a pair of outer, sheave axle mounting portions vertically planarly spaced from said central standard portion and from said frame means.

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